MEMORANDUM

TO: Chris Jordan (NOAA-F) and Gerald McClintock (BPA)

FROM: Mike Ward, Vice-President of Terraqua, Inc.

DATE: 6/30/06

SUBJECT: Draft Annual Report for Release 4

This annual report summarizes accomplishments during the performance period of Release 4 (from 7/1//05 through 6/30/06) and combines several deliverable reports under one cover. Reporting sections are organized by task and deliverables are highlighted with a "♣" symbol in the margin.

## *Task 4.1 ISEMP Coordination*

♣Coordination Report: The majority of work completed under Release 4 accomplished the purpose of task 4.1, specifically serving to ensure that all ISEMP activities in the Wenatchee and Entiat subbasins were performed within the overall ISEMP strategy for this pilot subbasin. The bulk of this work included coordinating implementation of at least 41 ISEMP monitoring indicators (i.e. contract elements) in at least 23 separate contracts/agreements between at least six funding agencies (BPA, NOAA, Chelan County PUD, UCSRB, WDFW, USFS) and about 13 contractors (Table 1).

The most important tools for achieving this high volume of coordination include (a) meetings of the Upper Columbia Regional Technical Team (RTT), (b) additional in-person meetings, and (c) telephone and email communication. ♣Meeting minutes for RTT meetings are attached <RTTMeetingNotesForRel4.zip>.[1] Important deliberations and decisions made regarding ISEMP implementation at RTT and other meetings are cataloged in the project tracking tool (see Task 4.2).

[1] The RTT met monthly between July 2005 and June 2006 except for July, September, and February.

**Table 1. Table of contracts coordinated (by contract element/monitoring indicator) during FY05 as part of Task 4.1.**

| | | | | | | Active (yes/no) | | |
|---|---|---|---|---|---|---|---|---|
| Subbasin | Monitoring Type | Indicator category | SOW | Contractor | Funding Agency(s) | FY2004 | FY2005 | FY2006 |
| Wenatchee or Umbrella | Status/Trend | Strategy Design | Strategy: Implementation Strategy for Wen and Entiat | Terraqua | BPA funded | yes | yes | yes |
| Wenatchee or Umbrella | Status/Trend | Strategy Design | Strategy | BioAnalysts, Inc. (Tracy Hillman) | BPA funded | yes | yes | yes |
| Wenatchee | Status/Trend | Smolts | Nason | YN (Yakama Nation) | BPA funded | yes | yes | yes |
| Wenatchee | Status/Trend | Smolts | Lake W. | WDFW | BPA funded | yes | yes | yes |
| Wenatchee | Status/Trend | Smolts | Monitor | WDFW | BPA funded | yes | yes | yes |
| Wenatchee | Status/Trend | Smolts | Peshastin | USFWS | BPA funded | yes | no | no |
| Entiat IMW | Effectiveness | smolts | smolt trapping | USFWS | NOAA funded | maybe | yes | yes |
| Entiat IMW | Effectiveness | smolts | pit tag deployment | USFWS | NOAA funded | maybe | yes | yes |
| Wenatchee | Status/Trend | Protocol Development | PNAMP Side-by-Side Terraqua: Release 3 ('05-'06) | Terraqua | BPA funded | no | yes | no |
| Wenatchee | Status/Trend | Protocol Development | 5 repeat habitat sites | Terraqua | BPA funded | no | yes | yes |
| Wenatchee | Status/Trend | Juvenile/Smolts | deployment of PIT tags at Nason screw trap and remote locations | YN | BPA funded | no | no | yes |
| Wenatchee | Status/Trend | Juvenile/Smolts | PIT tag detector array and deployment at remote locations | WDFW | NOAA for detectors, WDFW for deployment | no | no | yes |
| Entiat IMW | Effectiveness | Juvenile/Smolts | Lower Entiat Mouth | USFWS | NOAA funded, started July 2006 | no | no | yes |
| Wenatchee | Status/Trend | Juvenile/Smolts | deployment of PIT tags at all other screw traps and remote locations | CCPUD | CCPUD | no | no | yes |
| Wenatchee | Status/Trend | Juvenile/Smolts | deployment of PIT tags at remote locations | BioAnalysts | NOAA funded, started July 2006 | no | no | yes |
| Wenatchee | Status/Trend | Habitat/Bugs/Juvenile | habitat | WA DoEcology | BPA funded | yes | yes | yes |
| Wenatchee | Status/Trend | Habitat/Bugs/Juvenile | bugs | WA DoEcology | BPA funded | yes | yes | yes |
| Entiat B2B | Effectiveness | Habitat/Bugs/Juvenile | B2B-snorkel | USFWS | BPA funded | no | yes | yes |
| Entiat IMW | Effectiveness | Habitat/Bugs/Juvenile | day snorkeling at status/trend sites | USFWS | NOAA funded, started July 2006 | no | no | yes |
| Entiat IMW | Effectiveness | Habitat/Bugs/Juvenile | pH monitoring/water quality | USFS-PNW | NOAA funded, started July 2006 | no | no | yes |
| Wenatchee | Status/Trend | Habitat/Bugs/Juvenile | headwaters study | USFS-PNW | BPA funded | yes | yes | yes |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Entiat IMW | Effectiveness | Habitat/Bugs/Juvenile | water temperature | USFS-Entiat Ranger District | NOAA funded, started July 2006 | no | no | yes |
| Entiat IMW | Effectiveness | Habitat/Bugs/Juvenile | steelhead | USFS-Entiat Ranger District | NOAA funded, started July 2006 | no | no | yes |
| Entiat IMW | Effectiveness | Habitat/Bugs/Juvenile | McNeil core sample/fine sediment | USFS-Entiat Ranger District | NOAA funded, started July 2006 | no | no | yes |
| Wenatchee | Status/Trend | Habitat/Bugs/Juvenile | day snorkeling | USFS | BPA funded | pilot effort | yes | yes |
| Wenatchee | Status/Trend | Habitat/Bugs/Juvenile | night snorkeling* | USFS | NOAA funded, major funder of temporal variability | pilot | yes and temporal variability study | yes and temporal variability study |
| Wenatchee | Status/Trend | Habitat/Bugs/Juvenile | reconnaissance | USFS | BPA funded | yes | yes | yes |
| Wenatchee | Status/Trend | Habitat/Bugs/Juvenile | McNeil core sample/fine sediment | USFS | funded by USFS, has no formal reporting to ISEMP, currently funded by NOAA/ISEMP in Entiat | yes | yes | yes |
| Entiat B2B | Effectiveness | Habitat/Bugs/Juvenile | B2B random habitat | Terraqua | BPA funded | no | yes | yes |
| Entiat B2B | Effectiveness | Habitat/Bugs/Juvenile | B2B-habitat and Status/Trend sites | Terraqua | BPA funded | no | yes | yes |
| Entiat B2B | Effectiveness | Habitat/Bugs/Juvenile | B2B-habitat and Status/Trend sites | Terraqua | BPA funded | no | yes | yes |
| Wenatchee | Status/Trend | Habitat/Bugs/Juvenile | bug identification | Rhithron | BPA, funded through Terraqua | yes | yes | yes |
| Wenatchee | Status/Trend | Habitat/Bugs/Juvenile | water quality | CCCD | BPA funded | yes | yes | yes |
| Wenatchee | Status/Trend | Habitat/Bugs/Juvenile | recon for snorkel/habitat | CCCD | BPA funded | yes | yes | yes |
| Entiat IMW | Effectiveness | Habitat/Bugs/Juvenile | day snorkeling at status/trend sites | BioAnalysts | NOAA funded, started July 2006 | no | no | yes |
| Entiat | Effectiveness | Entiat IMW (intensively monitored watershed and comprehensive restoration) | McNeil core sample/fine sediment | USFS | funded by USFS in '04, '05; currently funded by NOAA/ISEMP in Entiat in '06 | yes | yes | no |
| Wenatchee | Status/Trend | Ecological | GIS classification work | Pacific Biodiversity | BPA funded for | yes | no | no |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Classification | | Institute | Wenatchee, UCSRB funded Entiat/Methow/Okanogan | | | |
| WenatcheeEntiat | Status/Trend | Coordination/mgt. | Coordination | Terraqua | BPA funded | yes | yes | yes |
| Entiat B2B | Effectiveness | Coordination/mgt. | B2B – Coordination | CCCD | BPA funded, other contributing | no | yes | yes |
| Entiat IMW | Effectiveness | Coordination/mgt. | IMW – Coordination | CCCD | NOAA funded, started July 2006 | no | no | yes |
| Wenatchee | Status/Trend | Adults | steelhead index sites | WDFW | BPA funded | yes | yes | yes |
| Entiat IMW | Effectiveness | adults | steelhead redd surveys | USFWS | NOAA funded | maybe | yes | yes |
| Wenatchee | Status/Trend | Adults | steelhead random sites | USFS | BPA funded | yes | yes | yes |
| Wenatchee | Status/Trend | Adults | recon steelhead random sites | CCCD | BPA funded | yes | yes | yes |

## *Task 4.2 Project Tracking Document*

♣A working draft "project tracking tool" has been created to document changes to scientific study designs (see printed excerpt in Appendix 2). Soon after development of this tool was initiated, it became apparent that the concept was better served in a database format rather than a document format. Databases lend themselves to updating or refreshing better than documents. Also, the need to sort among entries in this tool soon became evident. Finally, supporting documentation is often useful when a data analyst is trying to understand a decision made perhaps years ago by perhaps other people. To include additional documentation in a text format would be far too bulky.

Existing NOAA software initially offered a promising approach for quickly migrating project tracking data to the on-line environment. However, getting a database to operate on-line, in a way that is accessible to all ISEMP contractors and cooperators has been a large challenge. The logical ISEMP website for this hosting tool is managed by NOAA Fisheries. Security concerns at NOAA interrupted our efforts to post an interactive project tracking database tool at the ISEMP website using existing NOAA software. Security and technical issues are still being sorted out and have stalled the completion of content development for this tool.

Most recently, on July 21, 2006, NOAA and Terraqua identified new software managed by NOAA that can be adapted to serve the needs of this decision tracking tool and meets security concerns. NOAA is currently in the process of customizing this software for our needs.

Additional content continues to be added to the tables in advance of the functionality of the final software. A new target completion date of a working, on-line project tracking tool has been set by ISEMP managers for September 30, 2006.

The current vision for this project tracking tool is an easy-to-read/easy-to-use web-based tool that functions something like a weblog or chat room, with the ability to sort topics by thread, date, and many other parameters. The presence on the web will allow all ISEMP participants to check back on Project planning. There may be some limited access to Project participants for posting material – with an eye towards insuring consistency particularly at the design or project management level. There may be levels of formality built into the system so that entries could range in level from casual in-season updates up to data reporting and on up to scientific design and possibly project management decisions. This would facilitate requests from ISEMP contractors that the program needs a place to post charts, graphs, and reports, as well as the original idea of formally tracking our decision making over the life of the project.

In addition to the data displayed in the excerpt in Appendix 2, the final on-line version of the project tracking tool will also contain fields for editing and updating metadata such as entry creation date, entry creator, entry editor, entry edit date; the editing capability will be open to multiple users but ultimately have single person control over which edits are accepted; thread codes for tracking subtopics within an indicator or some other hierarchical approach to topic organization; organization that will allow other subbasins/pilot projects to use this tool to track decisions within their pilot projects; unique identifiers of "CoordinationEvents" that parallels the "MonitoringEvents" used in the NOAA data management system; fields that indicates when a

decision was later remanded or vacated and which decision entry is the currently operational procedure; the database will be useable in multiple views; the database will link to supporting documentation for those decisions where a document or email or report supports the decision.

It is possible that this tool could morph into a complete tracking tool that not only tracks decisions but also is a way to track the progress of the project: for instance, progress of field work (e.g. "snorkel surveys commenced today") and/or completion of reports (e.g. "the smolt trap annual report has just been uploaded, click here") and/or could even have links over to the Data Management System. However, this is not what was initially intended and is not currently part of the vision for this tool. Additional functionality remains low priority, but has not been ultimately rejected, until the next step in tool development is completed.

### *Task 4.3 Data Management System Development*

Terraqua served as technical liaison between ISEMP contractors and the data management system's developers to ensure that the developing data management system serves the ISEMP as implemented in the Upper Columbia subbasin. Terraqua represented the interests of the Project at development meetings held by NOAA-Fisheries and USBR and coordinated electronically and in-person with these and other entities that are developing the data management systems related to Project #2003-017-00.

In FY2005, the development of the data management system (DMS) moved away from data dictionary development and began to focus more on functionality. ♣The data dictionary that is currently in use is the 2004 version which is attached in separate file <DataDictionaryJohnDayPilotDraft.pdf>.

The bulk of the development work during this contract period focused on functional aspects of the DMS including: 2005 Wenatchee field data entry, database queries, data access web interface, protocol manager, database construction tasks, data transfer template, external dataset migration, GIS maintenance and further development, user documentation and user support. Terraqua played important roles in several of these areas including coordination of data transfer from ISEMP contractors to the DMS, assistance with development of database templates (see more detail below), and assistance with training. Most of Terraqua's participation involved making sure that NOAA development efforts and contractor needs were consistent with each other and with ISEMP strategy. See additional detail on these tasks in the DMS work plan that is attached (file <Work Plan for Phase II of the STM Database-MWCmts.doc>).

Perhaps the most notable advancement in data management that ISEMP has achieved in the past year has been the standardization among ISEMP contractors of the programs, tables, and formats in which data collected for ISEMP (and for the contractor's other needs) is being stored. Prior to this ISEMP effort, the different contractors used a variety of programs (e.g. Excel, Access) and formats (spreadsheets, tables, queries, and, worse yet, non-standardized fields/records formats) to store data which made data transfer to the DMS difficult. In the past year, ISEMP has trained contractors in the standard use of spreadsheet and database tools and has developed standardized database templates that are being enthusiastically adopted by ISEMP contractors. These templates are used by contractors on their desktop computers and are

configured for internal agency use as well as easy uploading to the DMS. To date, templates for water quality, habitat, and fish observations (e.g. smolt traps, electrofishing, snorkeling, spawning surveys) have been developed and are in use. Terraqua is developing a similar template for McNeil core fine-sediment data (see Task 4.8 for more).

### *Task 4.4 Pilot Subbasin Coordination*

The main pilot subbasin coordination activity involved preparation for data analysis, presenting a project summary to BPA staff, and developing a symposium paper, submitted to the American Fisheries Society for publication, that summarizes the ISEMP project. ♣See attached files for documentation of these efforts: for data analysis <ISEMPDataAnalysisPriorities '05-06.ppt> and <DataAnalysisPlanningMeeting051107-MWCmts.doc>; for the presentation to BPA, see the presentation made by Mike Ward <ISEMPWenEntBPAStatusPresentation060425.ppt>; and for the AFS paper, see <AFSsymposiumBouwes et al.doc>. In addition to these efforts, Terraqua also provided CSMEP with a summary of current ISEMP activities in the Wenatchee/Entiat <CSMEP2006SummaryofISEMPWenatcheeEntiat.pdf> and met with pilot subbasin coordinators at the December 2005 CSMEP meeting in Portland.

### *Task 4.5 Field Manual Development*

♣ See the file <ISEMPHabitatProtocolsFieldManualDraft_FinalReview.pdf> for the final draft of the 2006 working version field manual for the habitat protocols of the Upper Columbia monitoring strategy.

### *Task 4.6 Macroinvertebrate Analysis*

♣ Macroinvertebrate data from 73 sites sampled in 2005 has been developed and is in the ISEMP data management system.

### *Task 4.7 Entiat Effectiveness Monitoring*

♣ The following section reports field data validation per the deliverable specification:

In 2005, Terraqua conducted habitat surveys using the protocols of the Upper Columbia Monitoring Strategy at 11 restoration project control/treatment sites in conjunction with 3 snorkel surveys and at 10 randomly located reference sites. Project performance monitoring at the 1 site identified in the scope of work was completed by the project sponsor at their cost. Habitat data collected at these sites is in the ISEMP data management system and has been linked with snorkel data also collected at these sites.

Methods: FY2005 was the first year of data collection for the Bridge-to-Bridge (B2B) pilot effectiveness monitoring study. We studied habitat and fish densities at 11

control/treatment site components[2] at 7 treatment or control locations (see <EWPUMtg060405.ppt> for graphics; Figure 1). The goal for this analysis was to determine if our conceptual study design (Figure 2) was supported by the first year data. In this conceptual design, we anticipate that control and pre-treatment sites will look the same until the treatments (restoration projects) are implemented at which time the post-treatment sites should behave more like sites that currently have undergone restoration treatments (i.e. "pre-existing treatment sites").

Results and Conclusions: We looked at the hypotheses that (a) sites with pre-existing treatments should have higher fish densities than control or pre-treatment sites but (b) that control and pre-treatment sites should have similar fish densities (Figure 2). When we looked at all sites with main and side channels combined the hypothesized relationships were not evident (Figure 3). However, salmonid densities in side channels were much greater than in main channels (Figure 4), suggesting that the presence/absence of side channels needs to be controlled. When only main channels were compared, both hypotheses (a) and (b) appear to be supported suggesting that our conceptual study design is valid (Figure 5). We recommended that the B2B portion of the study continue within the context of subbasin-scale effectiveness monitoring to be implemented in FY07. We also recommend that more formal intervention analyses be performed to test these hypotheses when additional data has been collected.

## *Task 4.8 Develop Depth-Fines Protocol*

The protocol for measuring depth-fine sediment as described in the Upper Columbia Monitoring Strategy (i.e. McNeil core sampling) has not been successfully implemented under ISEMP as designed primarily due to its high cost, low return on useable data, and limited suitability to a small proportion of habitat sample sites. In 2005, Terraqua explored the use of an experimental protocol for sampling depth-fine sediment based on previous research by Garrett and Bennett (1996) and DeVries et al. (2002). The experimental protocol was tested at two reference sites in the Entiat subbasin.

The experimental protocol was almost immediately found (a) not to be applicable for use at the full range of sample sites likely to be encountered in the Wenatchee/Entiat rivers, and (b) not to be cost effective to implement in conjunction with other UCMS habitat sampling. For example, sampling at the easier (low gradient of about 2%) of the two sites took three-person days of labor while valid sampling at the other site (moderate gradient of about 3%) could not be completed in one day with a crew of three. Also, at the more difficult site and other sites that were reconned that would be typical of the full range of sites likely to be encountered, it was quickly apparent that this technique could not be implemented without heavy machinery and exorbitant cost. While our testing was unable to determine whether the experimental protocol might give an ecologically meaningful signal regarding the annual transport/deposition of fine sediment as hypothesized, further development of this experimental protocol was stopped in light of cost and applicability issues. Furthermore, an ecologically meaningful signal is unlikely

[2] Originally we had planned for 9 treatment and control sites only to find, in the field, that four "sites" were actually comprised of two components, a main and a side channel, each of which required separate sampling, for a total of 11 control/treamtment site components. Also, 2 of the original 9 were not accessible in 2005 due to landowner participation issues (since rectified in 2006 by restoration project coordinators).

using this technique in the locations where we need to employ it according to Dr. Rick Woodsmith, Geomorphologist with the USFS-PNW Laboratory and member of the Upper Columbia RTT, with whom we consulted during our testing process.

After learning first hand the type of data that we are seeking, and understanding the drawbacks to the authorized McNeil core sampling of fine sediment, Woodsmith (2006; <BPA_Proposal_Woodsmith_FineSeds.doc>) developed a proposal that would likely provide us with tools that could be used as a fine sediment surrogate. However, the cost of this proposal is high. Therefore, we recommend that McNeil core sampling be reconsidered – particularly because of the existence, made known to Terraqua through collaboration with Entiat Subbasin ISEMP partners in June, 2006, of a multi-site, 13 year time-series of McNeil core samples collected by USFS – by conducting additional analysis of spatial and temporal variability in McNeil core sample data collected at sites which integrate watershed-scale conditions. It is our hope that McNeil core sampling at integrator sites (like the sites used for watershed-scale smolt trapping and water quality monitoring in the Wenatchee) can provide us with adequate watershed-scale signals. If this is the case, we will recommend that the Upper Columbia Monitoring Strategy be revised to drop the concept of sampling depth-fines at randomly located sites. If our analysis of McNeil core sampling suggests it is not adequate for our needs, we will (a) re-evaluate our needs or (b) consider the Woodsmith (2006) proposal more closely. This analysis is underway as of August 16, 2006.

### *Task 4.9 Repeat Sampling in the Wenatchee.*

♣ The sampling called for in the scope of work was completed and has been delivered to ISEMP (in the now standardized MS Access format).

### *Task 4.10 Project Management and Environmental Compliance.*

♣ This project is currently up-to-date with all project management elements (e.g. accrual estimates) and environmental compliance.

### *Appendix 1. List of Attachments*

<RTTMeetingNotesForRel4.zip>
<DataDictionaryJohnDayPilotDraft.pdf>
<Work Plan for Phase II of the STM Database-MWCmts.doc>
<ISEMPDataAnalysisPriorities '05-06.ppt>
<DataAnalysisPlanningMeeting051107-MWCmts.doc>
<ISEMPWenEntBPAStatusPresentation060425.ppt>
<AFSsymposiumBouwes et al.doc>
<CSMEP2006SummaryofISEMPWenatcheeEntiat.pdf>
<ISEMPHabitatProtocolsFieldManualDraft_FinalReview.pdf>
<EWPUMtg060405.ppt>
<BPA_Proposal_Woodsmith_FineSeds.doc>

## *Appendix 2. Excerpts from Decision Tracking Tool*

The following table is an excerpt of content from the decision tracking tool which is still in development. The final version will contain many more fields that will be useful for sorting and management of the tool. Each decision or deliberation will also comprise a single record. Additional changes are underway pending the final adoption of a web-accessible software tool.

| Decision Date | Decision Participants | Supporting Documentation | Decision/Conclusion/Observation | Thread |
|---|---|---|---|---|
| 7/8/03 | RTT, Chris Jordan | RTT meeting notes, Terraqua files | **Decision**: Sampling universe will be 1:100,000 stream layer for site selection.<br>Deliberations: Sampling universe could be trimmed by excluding reaches by gradient (say, ≥12%), other selection criteria could include distance to source, stream order, wade/non-wadeable, balance between 2nd, 3rd, 4th, and 5th order.<br>**Decision**: We will have to guess on the number of sites to pick until we know more about spatial variance (eventually started with 50 sites on EPA's recommendation).<br>**Decision**: Decided on using a rotating panel design to account for presumed spatial and temporal variability of unknown magnitudes. | site selection design |
| 8/11/03 | RTT, Chris Jordan | <Ward20030822.pdf>, <Wenatchee Monitoring Strategy 6-30-3.pdf>, RTT meeting notes, Terraqua files | **Decision**: First draft sampling design: RTT agreed to a sampling design (described in <Ward20030822.pdf>) and decided to use stream segments of ≥300m for determining stream gradient and to locate sites equally in 1st through 5th order streams. June 30, 2005 draft of the "Wenatchee Monitoring Strategy" was also used to inform the first draft sampling design. RTT recommended the use of a new hydrography layer with stream gradient identified at 300-m reach segments. | site selection design |
| 9/2/03 | Phil Larsen | <Larsen20030902.pdf>, <HUCstreams.pdf> | First draft sampling design included Designs 1 – 4 and is described in <Larsen*.pdf> and is mapped in <HUC*.pdf> by Phil Larsen. These maps were based on the original hydrography layer cited in the PBI project as the base layer (reach segmentation at 300-m scale was not available in time for this draft). | site selection design |
| 9/10/03 | RTT | RTT notes, Terraqua files | **Decision**: Reaffirmed decision to not use 1:24,000 hydrography layer which was deemed insufficiently standardized to date. | site selection design |
| 11/6/03 | PBI | <Morrison20031106.pdf>, <Morrison 20031107.pdf> | Methods for generating a new hydrolayer identifying line segments by gradient are described. | site selection design |
| 11/8/03 | PBI | <Morrison20031108.pdf> | These results examine an earlier sampling scheme generated by EPA called <wenatcheedesgn1f.dbf> which was later modified (see 2/2/04) in response to this analysis. | site selection design |
| 11/12/03 | RTT | RTT notes, Terraqua files | RTT reviewed Designs 1 – 4 and deliberated the use of different designs for annual versus rotating panels and discussed ways to trim the sampling universe based on surveyor access.<br>**Decision**: Designs 1 – 4 are biased by ditches in the hydrolayer – this will be rectified by the use of PBI's modified hydrolayer which removes ditches.<br>**Decision**: Explore two scenarios selected from the <12% gradient universe including: 20% in each of 1st – 5th order streams (20/20/20/20/20) and one weighted toward 1st order streams | site selection design |

| | | | | |
|---|---|---|---|---|
| | | | (30/20/20/20/10). | |
| 12/5/03 | Tony Olsen | <Olsen2003120.pdf>, <LowGradientStreams2.pdf> | Presents first draft of Designs 5, 6, and 7. Errors were found in these versions of Designs 5 – 7 so they were scrapped and redone. | site selection design |
| 12/19/03 | Tony Olsen | <Olsen20031219.pdf>, <LowGradientStreams2.pdf> | Designs 5 – 7 replace earlier drafts. | site selection design |
| 1/7/04 | Ward, Jordan, Hillman, Haskins, MacDonald, EPA staff | <Ward20040107.pdf>, <Grad4Streams.pdf>, other individual emails and phone notes | **Decision**: The participants decided to explore the use of stream gradient classes as classes among which sites would be allocated. Ward*.pdf describes the three scenarios mapped in Grad*.pdf. | site selection design |
| 1/8/04 | Tony Olsen | <Olsen20040108.pdf>, <Wenatchee Gradient Design Documentation.pdf>, <Grad4streams.pdf> | Olsen*.pdf further describes the three scenarios (Designs G1, G2, and G3) mapped in Grad*.pdf. Haskins and Ward recommend G1 as the best design to date. Additional documentation and analysis of these can be found in Terraqua files (see Olsen 1/7/04 email). | site selection design |
| 1/26/04 | Hillman, Ward, Jordan | <Ward20040126.pdf> | **Decision**: Final site selection rules for 2004 are documented in Ward*.pdf | site selection design |
| 2/2/04 | Mike Ward, Tony Olsen, RTT, Chris Jordan | <Wenatchee Cat5 DesignDocumentation.pdf>, <Cat5streams.pdf> | **Decision**: Final 2004 site selection rules are described in these documents.<br>Site were selected from five categories based on stream gradient: [0,2], (2,4], (4, 8], and (8, 12] and Strahler order. [02]14 means 0 to 2% gradient on 1st through 4th Strahler order streams<br>[0,2]14 [0,2]5 (2,4] (4, 8] (8, 12]<br>Sample Size: .9*45% .1*45% 25% 20% 10% | site selection design |
| 2/11/04 | Hillman, Ward, Haskins | < UCB Monitoring Strategy 2-1-04.pdf> | **Decision**: Sites may be rejected from sampling for only two reasons 1) if they are physically inaccessible and 2) cannot be accessed because of landowner denial. "Physically inaccessible" was universally interpreted to mean sites which were unsafe to access; site-specific decisions about accessibility were left to reconnaissance teams or field crew leaders. | site rejection |
| 2/18/04 | Hillman, Ward, Haskins, MacDonald, Jordan | <Hillman20040218.pdf > | **Decision**: Sites may not be rejected from sampling due to low flow. Sites that fall in canals, ditches, or side channels (due to GIS errors) may be rejected from sampling because they are not properly within the sampling universe. Sites may be adjusted around lakes, reservoirs, waterfalls, ponds, or changes in stream order. For example, in the case of a site falling just downstream of a falls (in the case of an anadromous barrier for a site that was to sample anadromous fish), the site would be adjusted to begin at the falls and extend the appropriate distance downstream. | site rejection |
| 10/28/04 | ??Haskins and Hillman | <Haskins20041028.pdf>, <From Jaclie - site list pic28407.jpg> | **???? Decision:** The list of sites sampled and rejected in 2004 includes a reason for dropping sites that MW has no record of. (see related docs). Haskins*.pdf suggests that Hillman/Haskins agreed that sites which "did not contribute to fish production" could be dropped. I'd like to capture the decision making on this call – my | site rejection |

| | | | | |
|---|---|---|---|---|
| | | | only record on the topic is captured in the Hillman20040218.pdf We certainly need to include a record of the definition and criteria used to determine that a site "did not contribute to fish production."hillman confirmed this conversation on 4/20/06 – criteria would be if the site would never have water at the low flow period (like a dry gully or swale with perhaps spring time snow runnoff flow, summer thunderstorms) but never flow during low flow season – these would also be non-fish bearing and hence also outside the universe | |
| 1/11/05 | Hillman, Jordan, Haskins, MacDonald, Ward | Terraqua files, meeting notes from meeting at Wenatchee USFS | **Decision**: Do not use the same sampling design (i.e. sample sites) for steelhead redd surveys and habitat/snorkel surveys because the sampling universes for these two indicators are different. | site selection design |
| 2/23/05 | Merritt, Larsen, Haskins, Monahan, Ward, Jordan, Hillman (by phone individually with Ward) | Terraqua files, meeting notes from meeting in Olympia WDOE | Deliberated: 2004 habitat and snorkel results to refine sampling in 2005.<br>**Decision**: Master Sample List concept was introduced to the group by Larsen, group agreed that we need to develop an ISEMP master sample list, hopefully one that included the whole Upper Columbia.<br>Deliberation: Group considered whether the number of sites within anadromous habitat was too small compared to the overall effort. Things that were considered, included: there is may be less chance of restoration potential in remote, non-anadromous reaches; do not use "Intrinsic Potential" maps; make sure we don't miss bull trout; what are the boundaries of fish bearing waters; we want at least 50% of sites to be in anadromous water. Hillman pointed out that Wa. DNR is testing a model that looks at the break between fish bearing and non-bearing waters, so ISEMP should not put effort into trying to determine this break ourselves; instead, use 2005 to test the validity of this model. Considered restricting the sampling universe to fish bearing waters in an attempt to minimize the number of sites that can't be effectively sampled for fish<br>**Decision**: Jordan's crew will explore in a map exercise where is the line between fish bearing and non-bearing waters using USFS data, and will target sites to be allocated according to 34 in anadromous and 16 in non-anadromous. Jordan and Ward will make final site selection rules for 2005-2008 based on these results. Effort spent in non-anadromous sites will be helpful in determining the line between fish bearing and non-bearing waters.<br>**Decision**: Conduct habitat and snorkel surveys upstream of the hatchery on Icicle Creek but do not survey there for steelhead redds until after the barrier has been removed.<br>**Decision**: We reaffirmed the 1/11/05 decision to not use the same sampling design (i.e. sample sites) for steelhead redd surveys and habitat/snorkel surveys because the sampling universes for these two indicators are different. | site selection design |
| 2/23/05 | Merritt, Larsen, Haskins, Monahan, Ward, Jordan, Hillman (by phone individually | Terraqua files, meeting notes from meeting in Olympia WDOE | **Decision**: Wadeable habitat protocols are insufficient to capture a complete/accurate set of habitat metrics in non-wadeable streams; therefore, habitat crews will not sample sites that are non-wadeable.<br>**Decision**: Habitat surveyors will skip sites that fall within non-wadeable streams (defined as 5$^{th}$ order streams, which include the mainstem Wenatchee River) but will substitute with another site selected from the oversample.<br>**Decision**: Non-wadeable sites may still be accurately snorkeled (and 5$^{th}$ order sites are too important as fish habitat to be skipped); | site rejection |

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| | with Ward) | | therefore, sites may not be rejected for snorkeling solely on the basis of being non-wadeable.<br>**Decision**: Non-wadeable habitat protocols are under development by WDFW in Puget Sound and by Bob Hughes in Oregon. ISEMP will consider these protocols when they are more completely developed.<br>**Decision**: Sites that are too remote (i.e. greater than 10 miles from a trailhead and greater than 0.5 miles from a trail) will be considered "physically inaccessible" and will be rejected from sampling. | |
| 3/23/05 | Haskins, Ward, Larsen, Jordan, Hillman | Larsen20050325 .pdf, and Terraqua phone log 4/1/05 with Hillman | **Decision**: In cases where an x-site lands close to (within a ½ of a site length) the edge of the sampling universe, an anadromous barrier that would change the classification of the site, a stream order change, permission denial, or lake (and possibly other similar exceptions that would affect sampling design strata classification of the site), then the x-site would remain in the same spot but the upper and lower boundaries of the sites should be adjusted downstream (no more than ½ of a site length) so that the entire site would fall within the sample strata. If there is not enough space in the stream for a complete site to fall within a single sampling strata, then the site should be truncated in length to match the available space (but the size of the site that is eventually sampled needs to be recorded and the site situation needs to be noted in the data). All x-site-specified point measurements (e.g. preliminary bankfull widths used to determine the site length) must be done at the x-site, even if the boundaries of the site are adjusted as described in this rule.(*this is a duplicate entry as in steelhead redds – need to decide how to handle entries like this that pertain to multiple indicators or subindicators.)* | site rejection |
| 3/28/05 | Haskins and Ward | *Haskins email of 4/8*, Terraqua phone log | **Decision**: Do not use the GIS layer for "safety" to exclude portions of the watershed from the sampling universe when generating the sample site list. On-the-ground knowledge suggests that this GIS layer is inadequate for such use, instead we should continue to rely on quad-map-based reconnaissance to reject "physically inaccessible" sites. | site selection design |
| 3/31/05 | Rentmeester , Haskins, Ward, Merritt, Hillman | Team20050329. pdf | Deliberation: Team*.pdf describes technical specifications and deliberations of maps generated as a result of 2/23/05 meeting. These deliberations were used to determine the final 2005 site selection rules | site selection design |
| 4/3/05 | Merritt, Larsen, Haskins, Ward, Jordan, Hillman | Ward20050403. pdf | **Decision**: Draft 2005 site selection rules are described in this document based on 2/23/05 meeting and the map exercise<br>Sample sites in 2005 will be allocated according to the following:<br>-- first stratification: allocate sites per the 2004 rules but exclude non-fish-bearing portions of the stream network<br>-- second stratification: make sure that sites are distributed between anadromous and non-anad waters in a ratio of 70%anad:30%non-anad.<br>-- do not constrain sample site selection using the safety buffer. Crews will use the map/ground reconnaissance process to identify unsafe areas to be dropped.<br>-- in cases where sites land in 5th order streams (about 5% of 50), snorkel crews will still survey them but habitat crews will replace that site with a site of equal gradient class and fish-presence category<br>-- few 1st order streams may not be suitable for snorkeling. These would be skipped by snorkelers but surveyed for habitat. | site selection design |

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| | | | -- we anticipate snorkel/habitat overlap at about 45 of 50 sites. | |
| 4/6/05 | Jordan, Rentmeester, Ward | Ward20050408.pdf, Terraqua meeting notes | Participants met to develop 2005 sample list.<br>Deliberated: The 2004 annual panel of 25 sites included 24 in the fish bearing part of the watershed and 1 from non-bearing waters.<br>**Decision**: Need to add one site sampled in 2004 from the fish-bearing waters to the annual panel and drop the non-bearing site from the panel.<br>**Decision**: Leave site selection allocation as a random function between anadromous and non-anadromous (resident) habitat, which results in approximately 80%/20% split rather than impose a rule of 70%/30%.<br>**Decision**: Maintain some annual panel sites in non-anadromous habitat allocated by the natural proportion of anadromous to resident habitat. (this decision reaffirmed with Jordan/Ward on 4/25/05 after discussions with Larsen).<br>Deliberated: Rentmeester will lead an effort to search for the best allocation of sample sites within the strata we've identified. Our goals for this exercise will be to: 1) improve the logistics of snorkeling by moving snorkeling out of 1st order sites; 2) improve the signal in snorkeling by assuring snorkelers see more fish; 3) increase the number of sites in our integrator watersheds by reallocating from small headwaters watersheds, which would be achieved by a general shift of sites from 1st order to 2nd, 3rd, and 4th orders; 4) reallocate sites but don't deviate by more than 50% from the gradient/Strahler matrix that Steve has developed; 5) Steve found that no meaningful permutation to stratification by Strahler stream order changes the gradient distribution of sites significantly from the expected distribution based on random allocation of sites.<br>**Decision**: There is no need to include both stream gradient and Strahler stream order in the site allocation, therefore, we will drop gradient classes from future consideration in site selection (though we will still exclude reaches with gradients ≥12% from the sampling universe). | site selection design |
| 5/3/05 | Ward and Jordan | Terraqua phone log | *At some point in early 2005, we learned about an error in the EPA algorithm for site selection that affected the 2004 samples. I need documentation of this error from Jordan or Larsen*<br>Deliberated: Two glitches from 2004 were discussed, including: an error in the EPA site selection algorithm, and 2) our change in allocation rules between 2004 and 2005. These glitches forced us to reexamine our strategy for the annual panel.<br>**Decision**: The strategy for the annual panel is to maximize our time series versus optimizing the spatial balance each year. | site selection design |
| 5/6/05 | Rentmeester, Ward | Rentmeester20050506.pdf; SiteSelectionFinalRules2005.pdf | **Decision**: Steve sent out site list for 2005 after optimizing the distribution of sites among several strata. The final allocation (by fish classification and Strahler stream order) is as follows:<br>Fish Class / Strahler / # of 04 sites / # 05 sites<br>anadromous / 1 / 2 / 2<br>anadromous / 2 / 4 / 4<br>anadromous / 3 / 5 / 5<br>anadromous / 4 / 5 / 5<br>anadromous / 5 / 2 / 2<br>resident / 1 / 4 / 4<br>resident / 2 / 2 / 2<br>resident / 3 / 1 / 1<br>resident / 4 / 0 / 0 | site selection design |

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| 5/6/05 | Rentmeester, Ward | Rentmeester20050506.pdf; SiteSelectionFinalRules2005.pdf | **Decision**: If sites are rejected for any approved reason, they are to be replaced with a site, from the oversample list, in the same allocation category that the rejected site fell within. | site rejection |

cc: Chris Jordan by email on date 8/17/06